

Judkins 1845

INTRODUCTORY

LECTURE,

TO

A COURSE ON DESCRIPTIVE AND SURGICAL ANATOMY;

DELIVERED IN

CINCINNATI;

Nov. 3d. 1845.

BY JESSE P. JUDKINS. M. D.

4

CINCINNATI;

H. S. & J. B. M'GREW, PRINTERS

1845.

INTRODUCTORY

LECTURE,

TO

A COURSE ON DESCRIPTIVE AND SURGICAL ANATOMY;

DELIVERED IN

CINCINNATI;

Nov. 3d. 1845.

BY JESSE P. JUDKINS. M. D.

28808
Washington, D.C.

CINCINNATI:

H. C. & J. B. M'GREW, PRINTERS.

1845.

CINCINNATI, November 26th, 1845.

At a meeting of the Students of DR. JUDKINS' class, J. A. Kirkpatrick was called to the Chair and Theodore Cook appointed Secretary. On motion it was

Resolved, That a Committee of five be appointed to wait upon DR. JUDKINS, and request of him a copy of his Introductory Address for publication. The Chairman appointed the following gentlemen, R. M. Core, D. M. Vance, H. G. Carey, E. R. Morerod. On motion the meeting adjourned.

J. A. KIRKPATRICK, Pres't.

THEODORE COOK, Sec'y.

CORRESPONDENCE.

DR. JUDKINS,

Dear Sir:—Your class, highly pleased with your Introductory Address, through us their Committee respectfully request a copy for publication.

Yours truly,

R. M. CORE, D. M. VANCE, E. R. MOREHOD, }
H. CAREY, D. SERVISS. } Com't.

CINCINNATI, December 1st., 1845

Gentlemen:—In compliance with the request of the class, I herewith transmit to you a copy of my Introductory lecture.

The lecture was prepared at a period when my time, was almost constantly engaged with duties of a pressing nature. But, anxious to present matter that would interest you, I availed myself, freely, of quotations, from eminent writers, in order to enhance its value. It was not written, with the expectation that it would be required for publication.

Permit me, gentlemen, to embrace this opportunity, to offer you, and those you represent, my sincere acknowledgements for the gentlemanly deportment, and respectful attention that has characterized the whole class, which is much larger than I had anticipated; numbering nearly one hundred students—96 in all.

Please accept for yourselves, and for the class at large, my warmest wishes for your success and happiness through life.

Your Obedient Servant,
J. P. JUDKINS.

MESSRS. R. M. CORE, H. G. CAREY,
D. M. VANCE, D. SERVISS.
E. R. MOREHOD.

} Committee of Class.

INTRODUCTORY LECTURE.

GENTLEMEN:—In announcing to you my design, to give a course of lectures, upon Descriptive and Surgical Anatomy, I do not wish to speak of my abilities to teach, for others are better capable of judging in that particular than myself. But it may not be amiss to allude to the advantages I have enjoyed in the study of these branches, by stating to those who may be ignorant of the fact, that I have acted as Demonstrator of Anatomy, in the Ohio Medical College, for the last seven years, and have consumed some fifteen months, of the last four years, in lecturing upon Anatomy and Surgery, in the Summer School of Medicine.

Conscious however of the importance of the duty, I have to perform towards you, it shall be my constant effort, to give you accurate ideas of every part of which I shall treat. The plan intended to be pursued, will be to give the anatomical history of the human body, by demonstrating, the structure, position and relations of the different organs. I will endeavor to present the numerous facts in their most natural order, to describe each fact, clearly, precisely and methodically, and lastly, to direct the attention of the Student, to the most important points which should particularly engage his attention. In doing this, and speaking of the function performed by each organ, we will endeavor to embrace the science as it now exists. Probably no departments of human knowledge, has made greater advancement, within the past few years, than those of Anatomy and Physiology. By the zealous and untiring efforts of genius, assisted by the wonderful power of the microscope, organs, or the component parts of organs, which heretofore, had been scarcely within the bounds of conjecture, have been rendered susceptible of demonstration, and their offices with tolerable accuracy defined.

Our present lecture, will be chiefly devoted, to some general remarks, upon the bearing which our subject has upon other departments of our science, and upon professions unconnected with medicine. And in conclusion will attempt to adduce evidence, in a brief manner that the structure of man throughout its whole extent bears strong the "Impress of Heaven's signet as of immortal make."

The term Anatomy, is used to signify dissection, or knowledge acquired by dissection. And it has a double claim upon our attention, by being at the same time, both an *art* and a science. For in the pursuit of it, skillful manipulation is required, and as a science certain general principles are deducible from it.

The object of Anatomy, is to ascertain the structure and position of all organized bodies. It treats of the external form, or configuration of organs—their size, colour and texture. To it Physiology is most intimately connected, and should in some degree, be studied in the same connection; for we first endeavor to learn the structure of an organ, and then enquire into the function it performs; this last is the object, and in part constitutes the science of Physiology.

Anatomy then, teaches the organization of animals, whilst Physiology unfolds the nature of life, and together they form the broad basis of medical science. To the medical student, an early and intimate acquaintance with them, is indispensable to the successful prosecution of his studies. For without a knowledge of Anatomy, both healthy and morbid, no just pretensions can be made to either medicine or Surgery. Surgery in particular would cease to be a science, and its followers merely pretenders, groping in the dark.

A knowledge of disease whether it be produced by disorder of function or structure, presupposes an acquaintance with Anatomy; for healthy and deranged function cannot be understood, unless we are familiar with the structure of the organ affected. And as organs the most dissimilar in structure, may be located in the same region of the body, whose disorders may present symptoms, the most diversified, how important it is to know the peculiarity of their organization, in order to obtain correct ideas, for their treatment, when diseased.

It may be that the smallest filament of a nerve, which apparently subserves but little use in the animal economy, has often an important bearing upon the diagnosis of the disease, as it not unfrequently gives rise to symptoms which appear remote, from the real part affected. For instance, in disease of the liver, pain is often felt at the top of the right shoulder, and in *Morbus Coxarius* or disease of the Hip Joint, the pain is first experienced at the knee. It is necessary then to be thoroughly acquainted with our subject. By it the mystery of anomalous cases, is solved, and the practitioner is enabled early, to adopt a correct mode of treatment,—without it the true diagnosis would have been inaccurately determined, and the disease, have reached an incurable stage, hastened by the imprudent administration of remedies made upon false conclusions.

But to the Surgeon, anatomy, if possible, is still more indispensably necessary. Without it, his practice would be hazardous in the extreme, and I may add, would be criminal. What more especially belongs to him, is *Typographical Anatomy*, or the Anatomy of Regions, which treats of all the different organs contained in particular parts, and these are to be studied, as nature presents them, from the surface to the deep seated bones. Their exact relations are to be known, together with the various blood-vessels, nerves, lymphatic ganglia, &c. Without a knowledge of this kind, the Surgeon would be a dangerous man. The truth of this remark, can be fully appreciated, when I cite you to operations in Surgery, which, even when performed by the most skillful and intelligent Surgeon, are still fraught with great danger to the patient. No man, I would venture to say, who possesses feelings of humanity or common sense, would have the presumption to undertake any one, of the various capital operations, enumerated in Surgery, without a competent knowledge of the regions, which are implicated by the accident or disease. "It is anatomy that guides the eye and hand of the Surgeon. That inspires him with that ready confidence, which leads him to search among structures, whose lesion would be dangerous or fatal, for some vessel that must be tied, or a tumor which must be extirpated."

But without proceeding farther upon this point, I take it for granted that you are already fully impressed with the importance of these branches, as connected with our profession.

But our subject has more extended relations, wherein its utility is manifest. And first, upon one department of the *Fine Arts*, it has a very important bearing. To the *Sculptor* and *Painter* it is a subject, the knowledge of which, will contribute greatly, to accuracy of delineation, whenever the human form is concerned.

In imitations from nature, or in *Design*, which is more particularly the province of genius—where different forms and expressions of the human figure, are required, a knowledge of anatomy is indispensable.

The Artist should be acquainted, with the bony fabric, and apparatus of joints, the attachment and situation of muscles, and the subcutaneous cellular and fatty matter, where it is most abundant and where wanting. It is chiefly the arrangement of this last mentioned substance, that gives such beauty to the Female form, making it every where, smooth, equal, and beautifully round.

In representing the body in action, the various positions of which it is capable should be known. In *bearing a burden*, in *propelling a body forward by the hands and shoulders*, in *dragging a weight*, or in *squeezing*, a great variety of muscular contractions obtains, each producing different impressions upon the surface, which more particularly, is the study of the Artist, hence the cause of these impressions, should deeply interest him.

Animal movements in the manifestation of the different faculties of the mind, produce different kinds of expression; and to portray the *passions* upon canvass, the anatomy of the face should be well studied.

History informs us, that it was chiefly owing to the assiduity, with which *Michael Angelo* cultivated the study of Anatomy, that he was enabled to produce such master-pieces in his art.

Two reasons have been assigned for the alledged superiority of Ancient over modern Artists, one was, "*that they had the advantage of the finest models*," and the second, "*that they studied with the most diligent assiduity*." Without going into an investigation of the comparative beauty and perfection of objects, as they then existed, with the present, we will merely observe, that the present age, offers greater facilities for the study of the human body, than was ever possessed by the Ancients—among whom Anatomy was but imperfectly understood.—Their superstition and the reverence which they entertained towards the dead, deprived them in a great measure, of the advantages now obtained from dissections.

We see then, the importance of our subject as connected with this branch of science; nor should it be restricted here. Its temple of knowledge, should be thrown open to the whole world. In fine, it should constitute part of the education of every man; not as an accomplishment merely, altho well entitled to be called so, but as a subject of the greatest practical utility; and I believe that the period is not far distant when ignorance of anatomy—I allude now to a general knowledge of it, will be considered a *reproach*, to all those who make pretensions to a liberal education. Why is it, that the mass of the people are so reluctant to engage in this study? If the Dissecting Room presents scenes too revolting let them resort to works upon anatomy, illustrated by accurate plates. This would give them a general knowledge of their frame, which would prove a source of gratulation to themselves, and be of infinite service, to their fellow beings around them, as they might frequently be placed in circumstances where such knowledge

would be of vital importance. It is impossible to conceive of a more painful scene, than to witness the death of a friend, from the wound of some important bloodvessel, where the life-blood, is slowly ebbing from the heart—when, if possessed of the requisite knowledge, the mere stretching forth of your hand, and judiciously applying pressure, would save him from premature death.

Again, if this branch of knowledge was more generally taught, so as to impart to the mass of the people, even an indifferent idea of the structure and conformation of their bodies, it would tend greatly to do away with every species of quackery in medicine. Teach them that their organization is so wonderful, that in it “every thing has been provided and prearranged with such intelligence and wisdom, that no single fibre can acquire the slightest addition, or undergo the least diminution of power without the equilibrium being destroyed and disorder being induced” and they will not be so eager to grasp the innumerable quack nostrums which are gulped down with such avidity at the present day. What person among you, I would ask, who, possessing an intricate piece of mechanism—say a valuable watch for instance—which by accident had become impaired, and unfit for use, would place it for correction in the hands of one unacquainted with its composition? Not one, I am sure. Then who in his senses, with a knowledge of the organization of his own body, wherein the wonderful powers of vitality, are superadded to machinery, in the highest degree of refinement and perfection, would think for a moment of placing it in the hands of one, so totally ignorant of its conformation and structure?

But, aside from the principle of self-preservation, our subject presents strong inducements for its study, by appealing to our curiosity. In the language of a celebrated writer, “Anatomy is the science, which of all others excites the greatest curiosity. If the Mineralogist and the Botanist are so eager, the one to determine the nature of a stone, the other to ascertain the character of a flower:—If the love for their particular science induces them to undertake the most dangerous voyages, in order to enrich it, with a new species, what ought to be our ardor in pursuing the study of man—that master-piece of creation! where structure, possessed of both delicacy and strength, exhibits so much harmony as a whole, and displays so much perfection in its parts.”

By the aid of the microscope, we can trace in the primitive formation of the tissues of the human body, in their first development, a perfect analogy to the cellular origin of vegetable matter. The gum of vegetables and the albumen of animals, are the germinal materials for the elaboration of cells. We can conceive of nothing more beautiful in nature than the phenomena attendant upon the organization of living tissues. The profession is indebted to *Dr. Carpenter* of England for the best description of the *Formation of Cells*, and their progressive development. We will in a brief manner touch upon his views, in order to give you an outline of the process, by which the component parts of the body are formed:

Albumen, which is abundantly found in the *Chyle, Lymph and Blood*, is the material from which all the animal tissues are formed; and it holds nearly the same position in the animal economy that *Gum* does in vegetables. Although, before it can become organized structure, it generally must pass through the condition of *Fibrin*, which last substance is analogous to the glutinous compound, which is formed from the *Gum* in the progressive development of tissue in vegetables.

Dr. Carpenter remarks that “It is in the fibrin of the blood, which appears to be formed by the action of living solids upon *Albumen*, that all the organized, or struc-

turalized constituents of the body have their immediate origin. Hence it has been designated as the general formative element, or *blastema*, ('germinal matter.')

If the *Glutinous fluid*, or *fibrin*, when in contact with a living solid, be subjected to a microscopical examination, we can detect the first perceptible sign of organization, in the appearance of a number of extremely minute granules, which in short time increase greatly in size, having a disk-like or oval form. These bodies are termed the *Cytoblasts*, or *Cell Germs*:—"From the surface of each of these, a delicate, transparent membrane is seen to project, as a watch-glass from a dial, and this is the commencement of the cell." After the cell is formed; a portion of the cytoblast may often still be seen upon its walls, from which other cells can be generated. The cell at first grows from the fluid it contains, and afterwards, absorbs nutriment through its walls. The form of cells, which may be flat, square, cylindrical, globular or fusiform, is determined by the nature and direction of pressure, to which they are subjected, becoming elongated in the direction of the least resistance.

Some discrepancy of opinion exists, among Physiologists, concerning the origin of the *Cell Germs*. Some believing that they come directly from the chyle, as *chyle globules*, others pronounce them identical with either the white corpuscles of the Blood, or the nuclei of the Red Globules. They appear to have an independent life, and have the power of reproduction.

When the cells are first formed, no difference is discernable between them; they all present the same appearance, but by *Assimilation*, whereby they abstract certain elements of the blood, and convert it into their own substance, they soon begin to change, some are converted into *muscular fibre*, others into *nerve tubes*, others into bone, and so on with all the remaining tissues of the body.

The circumstances most favorable for observing the process of organization, is when *Coagulable Lymph* is effused between the lips of an incised wound, or upon the surface of an *inflamed membrane*.

When the *Liquor Sanguinis*, known by the name of *Coagulable Lymph*, is effused between the edges of an incised wound, it coagulates like blood; the serum, being set free by the concretion of fibrin, is absorbed: the fibrin speedily attains a density, almost membranous: "If this be examined with a microscope at the commencement of the process of organization, it is seen to contain a large number of exudation corpuscles, which probably either originate in the lymph globules, which have circulated in the blood, or in the nuclei of the red corpuscles. In a short time these corpuscles present the appearance of regular cells, disposed in layers, and adhering together by an intermediate unorganized substance. Some hours later, the mass exhibits an evidently fibrous character, and this is due to the adhesion of the cells to each other in lines, their form being prolonged in the same direction. Between these cellular fibres a considerable amount of *cytoblastema* yet remains, and they may be readily separated or torn in any direction. A vascular rete next makes its appearance and forms connexions with the vessels of the subjacent surface. The first appearance of this net work, is in the form of transparent, arborescent streaks, which push out extensions on all sides; these encounter one another and form a complete series of capillary reticulations. Before the vascular rete appears, pale colored cytoblasts are produced, which after the completion of the rete, pass over into the nearest capillary veins, being pushed on by the blood, which is brought from the nearest arteries, and in this manner the circulation is established. The character, whether arterial or venous, which the tube is to assume, depends upon its proximity with some vessel of the subjacent membrane with which it becomes continuous."

Aside from the interest which the beauty of this arrangement excites in the mind, our knowledge of it can be rendered subservient to questions in Pathology, and other departments of science. I will mention a case in point, which was recently brought before the "*Rush Medical Society*," of this city. An excellent paper was read by one of the members upon the *Organization of Tubercle*, which was advocated in an able manner, showing the position the matter occupied, its probable origin, and that it was surrounded by living tissues, while it was contended, that the fact of its possessing neither blood vessels, nerves or lymphatics, was no proof against its organization, for the vessels are also wanting in fibro and articular cartilages and the cornea, and no person would, certainly, doubt their organization. In the *negative*, it was stated that the presence of vessels, nerves, &c., in a part was only characteristic of a *highly* organized structure, whilst the component part of these vessels, &c., as well as tissues through which they permeate, possessed a regular *cellular organization*, as do, likewise, articular and fibro cartilages, and the cornea, but in *Tubercle* no vestige of a regular *cellular* arrangement can be detected.

Again, a knowledge of the formation of cells may be rendered valuable in *diagnosis*, especially if the assertion should be verified, "That in malignant *tumors* of the body, the cells which form them have no regularity in their development or arrangement, but present a confused appearance, growing rapidly and destroying contiguous parts by pressure." This state of things, if such truly exists, might be early distinguished from the development of *cells* which form healthy tissues "which must proceed in a determinate direction, or no regularity in the fabric can be the result." In offering this, as farther inducement to the study of Anatomy, we see that the subject is not void of interest even to the general student. "For does it afford no pleasure to study the structure and functions of the *Stomach* and *Liver*, and other organs concerned in changing a mass of beaten food, perhaps some of the coarser vegetables, into blood? Of the *Heart*, *Arteries* and *Veins*, which convey this fluid to the amount of three gallons through the body, once in *four minutes*? Of the *Lungs*, which restore the half spoiled blood to its wonted purity, as fast as it is sent into them, and enables it to pursue its healthy course, through its ten thousand channels? Of the *brain*, and especially the *Nerves*, which by their innumerable branches, spread themselves over and through, every soft part of the human system, in such numbers that we can nowhere, insert the point of the finest needle without wounding them? And of the *Skin*, every square inch of which contains the mouths of a million minute vessels?"* Is not this sufficient to enlist the attention? Yet possessing such claims, is it not strange that its study should be so little cultivated? No department of science—I would hazard the remark—is more neglected among men. The physical structure of their own frame, is unknown to them: and yet "a man would be considered shamefully ignorant, who, after occupying a dwelling for *sixty* or *eighty* years, would be unable to tell the number of its apartments, or the character of its materials? or perhaps even the number of its stories;" but such is virtually the condition, of at least, three-fourths of the inhabitants of the globe.

Can it be that other causes exist, independent of those adverted to, that deter men from entering upon this study? Is there any cause for such repugnance or terror as has been applied to some of the new doctrines of the present day, as being unholy in its tendencies? It has been alleged, but with what justice any rational man can determine, that medical science tends to establish in the breast of its votary, feelings of Skepticism in religion. The charge is groundless in itself, and cannot command even plausible reasoning to sustain it. It is true, that *Skeptics* have

[*HUNTER.]

been found in our ranks ; but shall the ignorance or *perverted* judgment of a few misguided men condemn the whole profession ?

From the position which Physicians occupy in society, their daily intercourse with the sick and dying, and the harrowing scenes they so often witness, the religious community expect much from them, and it may be, that they are remiss here in a duty which they owe to society. But the study of our noble profession instead of *engendering* principles of Infidelity, on the contrary, establishes in the student, a well founded belief, in the existence of a *Supreme Being*, possessed of power, wisdom, and goodness in the highest perfection. And no part of the science can contribute more to this belief, than that of Anatomy, "Wisdom the manifestation of *Omnipotent Deity* is displayed at every step of Anatomical research."

To the eye of the Anatomist, a thousand things are presented, concerned in the organization of man, which every one must acknowledge, are stamped with *intelligent design*, and all wonderfully fulfilling the end. Witness the conformation of the bony structure of man, so beautifully formed for progression, and wisely arranged for the protection of the most vital organs. "In this system, we see, the perfect adaptation of more than 200 bones, wherein lightness and strength are usefully combined. We see wisdom displayed in their highly polished joints, and the formation of the Synovial membrane and fluid, for lubricating and rendering their motions always free, and in the arrangement of the strong ligaments for retaining them in their places."

And the farther we advance in our study, the more convincing are these proofs of Intelligent *Design* in our formation. In directing our eyes to the muscular system, how wonderful to us is the structure of its fibre and the powerful action of which it is capable. With what wisdom are they adapted to the ends they perform, both in *animal* and *organic* life. Their fibres assuming every shape and direction, to fulfil the duty assigned them ;—some under the control of the *will* acting in all the various movements of *animal* life ; others are wisely formed independent of the *will*, and work on incessantly, night and day ; for it is upon *their* continued action that our existence mainly depends. The power and velocity with which some muscles are capable of contracting, is indeed astonishing. That comparatively small muscle, known by the name of *Biceps Flexor Cubiti*, is capable of exerting a force equal to 600 pounds, in raising a weight ; and the rapidity with which some muscles act, is almost inconceivable.

The same evidence is rendered manifest by an inquiry into the *composition* of the *Blood*, and the apparatus for distributing it throughout the body. This important fluid is richly laden with nutriment, (obtained by digestion from the food,) and is propelled by the ceaseless action of the *Heart* and *Arteries*, to every part of the system, through minute vessels, which act like so many little *Artizans* in repairing breaches in the organic structure of any part. The "*Blood* is a reservoir" from which every Gland, membrane, and every tissue of the body, selects a principle peculiar to itself, either for nourishment or as a secretion.

How strong is the evidence of *Divine Power* manifested, in the Circulation of the *Blood*.—The *Heart* which is its source, (and upon whose healthy action *life* greatly depends,) is taken entirely from under the control of our unstable *Will*,—it works on incessantly, independent of the Intellect. It is chiefly under the laws of organic life, over which preside the great Ganglionic system of Nerves. Now if the continued pulsation of the *Heart*, (which is essential to life,) was left to our vigilance, how soon would we let its motion cease, and cease forever.

But to pursue our enquiry farther, by investigating the *Absorbent System*, we have new cause for wonder and admiration. Millions of these vessels, of the most delicate structure, traverse every part of the body; one set of them takes up the nutriment after it has been prepared by Digestion, and carries it into the general circulation, by which it is distributed to every part of the system.—The Absorbent vessels act as the Guardians of the general health. When too much nutriment for its wants has been introduced into the system, or when some important secretion has been suppressed, evil would arise if the superfluous matter could not be removed. By the absorbents, this is taken up, and stowed away as a dispose matter, in the cellular membrane, or deposited in the cavities of long bones. And when the supply of nourishment fails from without, the *absorbents* go to work to bring back the matter thus stowed away, and appropriate it to the nourishment of the body.

Again, if we turn our attention to the *Respiratory Apparatus*, we see the work of a *Divine Hand*. How delicate and beautiful is the mechanism, and what an important function it performs in the life of the individual! The *Lungs* are chiefly composed of *air cells*, millions in number. Through their delicate walls, the Atmosphere acts upon and deprives the blood of its impurities, and imparts, in exchange, a vitalizing principle, which is indispensable to the extended and important purposes it is destined to subserve in the animal economy.

But if stronger evidence is yet required, we have it in studying the *Nervous system*; in viewing its organization and the relations it bears to every part of the body, and the wonderful and diversified offices it performs. In a portion of this system, it is almost universally believed, is seated the *immortal part of man*, and through its agency the *Soul* manifests its wonderful attributes.

We see wisdom displayed in the *Brain*, whose delicate structure is wisely protected from external injury, by the composition and shape of its bony covering; and protected also within, from the shock of the blood, (caused by the pulsations of the heart,) by the manner in which it receives it. The Brain is of a nature so tender, that the force of the circulation would be sufficient to break it down, if a wise provision were not interposed for its safety. This is done by the arrangement of the *Pia mater*, a vascular membrane which receives the blood from the larger vessels, breaks the force of its pulsations, and carries it gently into the substance of the Brain.

How difficult it is, after the closest inspection of the composition of the Nerves, to reconcile them, in our minds, to the various functions which they perform: Some presiding over sensation, others over motion; some of special, others of general sensibility; some belonging to *animal*, and others to organic life,—when all, apparently, are identical in their structure.

They are the medium through which we hold converse with the external world; and along them the swift messengers of the *will* wing their way with incredible velocity. Upon their arrangement depend the various sympathies of our nature, so wonderful in their effects. They superintend the whole system of organs in carrying on the work of life. No compound organ could perform its office without their aid—"the voice would be dumb, the Heart motionless, and the Lungs cease their complex action." They are the agents of every sensation we feel, both external and internal, painful and pleasant. How apparent are the designs of our *Creator*, in implanting these sensations in our nature,—the painful ones to protect us from harm, and the pleasurable ones inviting us to actions for our preservation and happiness.

From observation and experiment, we are made acquainted with the functions of the *Nervous System*; but no ingenuity or reasoning of man, alone, could enable him to determine their use, after the minutest enquiry into their structure.

It is true that a current of Galvanic fluid along their trunks, will produce effects somewhat analagous to their own; but it is far inferior to that perfection manifested in life, where a principle is supplied by the wisdom of Omnipotence.

In studying the various systems mentioned, we have had evidence strong of wisdom and design displayed in their organization, a part of which we are able to comprehend, but the greater part still rests with our Creator. This evidence is augmented, by witnessing the reciprocal dependance which vital organs have upon each other. If the Lungs fail, from any cause, in their duty of purifying the impure venous blood, the Heart's action would be enfeebled by the presence of that blood in its cavities—a quantity of it is still sent to the Brain, upon which it has a deleterious influence, impairing its power and rendering innervation deficient; hence the Lungs, with every other part of the system, are deprived, in some measure, of their ordinary amount of nervous influence—the whole system becomes disordered, and if the evil continues, must be destroyed.

Mueller, the celebrated Physiologist, says “that a reciprocal action of different parts of the system most evidently exists,—for respiration in the Lungs is the cause of the action of the Heart—and the motion of the Heart, at every pulsation, sends blood prepared by respiration to the Brain, which thus acquires the power of animating all other organs, and again gives occasion to the respiratory movement. The external impulse to the whole machinery, is the atmospheric air, in respiration. Any serious injury done to one of the principal moving powers of the mechanism, might be the cause of death—but this harmonious action of the essential part of the individual subsists only by the influence of a force, the operation of which does not depend upon any single part. This force exists before the harmonizing parts, which in fact are formed by it, during the development of the embryo.” The force or influence to which this gentleman alludes, is the *Vital Principle*,—Life; or call it what we may, it is something superadded by our Creator to the matter of organization.

The elements of our material structure are rendered familiar to us, by the aid of *Chemistry*; but the *Vital principle* which pervades every living part, and which holds all in such wonderful control, although evident to our senses, we are unable fully to comprehend. It is present from the first germ of being, and probably presides over our organization from the elements of matter. “It differs from Mind, for it is present in the Idiot and in inferior animals.” Whatever it may be, although we are acquainted with its laws and phenomena, its nature and origin are hidden from the *Eye of Science unassisted*, and the boasted and lofty pretensions of Philosophy are unable to solve it. The celebrated *John Hunter*, whose untiring industry in the investigation of Life, and whose comprehensive genius, has seldom if ever been equalled,—resting from the labors of his stupendous works, says that “The mere composition of matter cannot give life, for the dead body has all the composition it ever had. Life is a property we do not understand; we can only see the necessary leading steps towards it.” Thus, it has always been and continues to be a mystery—to solve which, all physiological speculation is inadequate.

But in addition to all this, we see yet higher in man—far superior to all else, placing him at the head of created things—the *immortal Soul*, the source of Intellect and *moral feeling*, which is superadded by the Almighty. Man is not superior in every part of his organization to many inferior animals. “He cannot compete with the Elephant in strength, with the Eagle in sight, or with the Reindeer in swiftness.” But he stands at the head and lords it over all, by the power of that stupendous mind with which his creator has endowed him.

In sketching thus imperfectly the various parts enumerated, we have said nothing of the *Eye* or *Ear*—of their beautiful and complex structure, and their nice adaptation to the laws of light and sound. “The skilful optician can, by his ingenuity, make instruments that will assist the eye in vision,—but he cannot make a substitute for it. In refinement of construction, he cannot even approach it. Nothing from his hands can of itself, like the eye, correct spherical *aberration*, or provide for the adjustment of its refracting powers, to the different distances of the object viewed.”*

Such facts as these, are well calculated to exalt our ideas of *Divine Intelligence*. For that there can be no effect without a cause, is self-evident to every thinking and intelligent man. He knows well, that human wisdom and ingenuity in its greatest perfection, is incapable of imitating the simplest of these,—even in their passive, lifeless condition. How infinitely greater, then, must be that *Power* which can form them thus, and impart a living principle which keeps them in such wonderful operation!

It is said that “an undevout Astronomer is mad.” The same may be truly said of the close enquiring Anatomist, although in his field of study he has not that display of grandeur and sublimity to startle and awe him, which so essentially characterizes the study of the Heavens. Yet he meets at every step of his research, organs and systems of organs, whose mechanism is wonderful and which act in harmonious concert with each other in the maintenance of life.

From an inquiry of this kind, is it reasonable to suppose that principles of Infidelity could be engendered in the mind of the student? On the contrary, every thing he views in the constitution of *Man*, proclaims his *Creator* a Being of Infinite Power and Intelligence. And the more minute and extended his knowledge of Anatomy is, the more abundant will this evidence be given him.

A simple contemplation of *Man* as he is, and his connexion with the external world, and the weight of thought which it forces irresistibly upon the mind, is of itself sufficient to overthrow the skill and sophistry of the *Atheist*. It alone has almost the power of conviction, striking through the understanding and appealing to the *Soul* to acknowledge its high birth.

* ROGET.

